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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/596,057	05/26/2006	Sandrine Dulac	007035.00013	1254

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EXAMINER	
PATEL, DEVANG R	
ART UNIT	**PAPER NUMBER**
1793	

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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/596,057	DULAC ET AL.	
	Examiner	Art Unit	
	DEVANG PATEL	1793	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 April 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-22* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-22* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 4/7/09 has been entered.

Claim Rejections - 35 USC § 112

1. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

2. **Claims 1-18** are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention.

Independent **claims 1 and 14** require coating brazing alloy (cladding layer) **as a single coating** on face of the core alloy plate. The original specification neither mentions applying the brazing alloy as a single coating nor it was shown or described in such a way as to reasonably convey “single coating” to one skilled in

the relevant art. Therefore, the claims fail to meet the written description requirement.

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

2. **Claims 1-6, 8-12 and 14-22** are rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 5863669, of record) in view of Dockus et al. ("Dockus", 2003/0155409, of record).

a. **Regarding claim 1**, **Miller** discloses a process for assembly of aluminum alloy sheets (plates) [col. 10, lines 15-20] comprising brazing at about 600°C [col. 4, line 40; col. 5, lines 12-20], and rapid cooling [col. 5, line 60]. Miller's brazing does not mention the use of any flux and thus, in accordance with broadest reasonable interpretation, it meets the limitation of "fluxless brazing". Miller fails to disclose fluxless brazing under controlled nitrogen or argon atmosphere. However, **Dockus** (drawn to fluxless brazing) discloses a similar process of assembly of brazed component including core aluminum alloy, carried out in a fluxless, inert atmosphere [¶ 24-25; nitrogen- ¶ 226]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to perform brazing process of Miller in a fluxless, inert atmosphere in order to avoid

difficulties caused by the use of flux such as flaking, contamination & cleanliness and prevent oxidation [Dockus- ¶ 5; ¶ 226].

i. Miller discloses the aluminum alloy plate consisting essentially of: a core alloy with composition (% by weight): Si >0.30; Fe <1.0 ; Cu 0.3-1.0; Mn 0.3-2.0; Mg 0.3-3.0; Zn<6.0; Ti<0.1; Zr<0.3; Cr<0.3; Ni<2.0; Co<2.0; Bi<0.5; Y<0.5 (i.e. 0), remainder aluminum [col. 3, lines 54-65; col. 4, lines 20-36].

ii. Miller discloses an aluminum brazing alloy (clad layer) applied to at least one face of the core alloy (col. 4, line 45), but does not expressly disclose applying as a single coating. However, such is well-known in the art. **Dockus** discloses applying a cladding layer (similar to Miller) on the core alloy using spray coating [¶ 96-97; layer 2 in fig. 2]. In accordance with broadest reasonable interpretation, a single clad layer applied using spray coating meets the limitation of a "single coating". It would have been obvious to a person of ordinary skill in the art at the time of the invention to apply clad layer of Miller as a single coating since such is an art-recognized alternative of applying brazing alloy layer.

iii. Miller discloses the brazing alloy containing 5% to 14% of silicon [col. 4, line 44-48], but does not disclose including 0.01% to 0.5% of at least one element selected from the claimed group (which includes Bi, Pb, and Sb). However, **Dockus** teaches that bismuth or lead are known in prior art as useful braze modifiers, also referred to as "wetting agents" or

"surface tension modifiers" [¶ 84]. Dockus discloses an aluminum brazing alloy coated (cladding layer) on the core alloy, the brazing alloy containing 5-14% Si (just like Miller) and an element selected from bismuth, lead, tin, lithium, etc. [¶ 97-98, 103]. Dockus further states that good results are obtained if one or more elements of the group Bi, Pb, Li, or Sb are added to the clad layer [¶ 112]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate one or more elements such as Bi, Pb, or Sb as shown by Dockus in the brazing alloy of Miller in order to promote brazing and maintain consistent brazeability [¶ 84, 112, 145].

With respect to the wt% ranges in all claims, it is noted that in the case where the claimed ranges "overlap or lie inside ranges disclosed by the prior art" a prima facie case of obviousness exists. *See MPEP 2144.05.* In the event that there is a trivial difference in the wt% (i.e. 0.1% compared to 0.2%), it would have been obvious to one of ordinary skill in the art at the time of the invention to choose the instantly claimed ranges through process optimization, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

b. **As to claim 2**, Miller discloses copper content of the core alloy is between 0.35% and 1% [col. 3, line 56].

c. **As to claim 3**, Miller discloses the manganese content of the core alloy is about 0.7%. It would have been obvious to one of ordinary skill in the art at the

time of the invention to choose the instantly claimed ranges through routine experimentation, since it has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art.

d. **As to claim 4**, Miller discloses Mg content of the core alloy is between 0.35% and 0.7%.

e. **As to claim 5**, Miller discloses zinc content of the core alloy is less than 0.2%.

f. **As to claim 6**, Dockus discloses bismuth content of the core alloy is between 0.05% and 0.5%.

g. **As to claim 8,** Miller discloses the claimed core alloy composition as explained in claim 1 above.

h. **As to claim 9,** Miller discloses that brazing layer is cladded onto the core alloy by co-rolling [col. 5, lines 4-7].

i. **As to claim 10,** in accordance with broadest reasonable interpretation, particles are very small bits of matter, and the coating of Miller is intrinsically composed of particles.

j. **As to claim 11,** it is well-known in the art to employ the brazed assembly in manufacturing heat exchangers. Dockus discloses using the process for manufacturing of heat exchangers [¶ 3]. Aging is reasonably expected to occur in hot parts during operation of the exchanger.

k. **As to claim 12,** Miller discloses aging at an elevated temperature in the range of 100°C - 250°C after rapid cooling, which results in high post-brazing strength properties [col. 5, lines 26-58].

l. **Regarding claim 14**, **Miller** discloses a process for brazing aluminum alloy sheets (plates) [col. 10, lines 15-20] at about 600°C [col. 4, line 40; col. 5, lines 12-20], and rapid cooling [col. 5, line 60]. Miller's brazing does not mention the use of any flux and thus, in accordance with broadest reasonable interpretation, it meets the limitation of "fluxless brazing". Miller fails to disclose fluxless brazing under controlled nitrogen or argon atmosphere. However, **Dockus** discloses a similar process for brazing component including core aluminum alloy, carried out in a fluxless, inert (nitrogen- ¶ 226) atmosphere [¶ 24-25]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to perform brazing process of Miller in a fluxless, inert atmosphere in order to avoid difficulties caused by the use of flux such as flaking, contamination & cleanliness and prevent oxidation [Dockus- ¶ 5; ¶ 226].

iv. Miller discloses the aluminum alloy plate including a core alloy with composition (% by weight): Si 0.40 [col. 4, line 20]; Mg 0.1-0.6; Cu 0.2-2.0; Mn 0.7-1.5 [col. 3, lines 55-58].

v. Miller discloses an aluminum brazing alloy (clad layer) applied to at least one face of the core alloy (col. 4, line 45), but does not expressly disclose applying as a single coating. However, such is well-known in the art. **Dockus** discloses applying a cladding layer (similar to Miller) on the

core alloy using spray coating [¶ 96-97; layer 2 in fig. 2]. In accordance with broadest reasonable interpretation, a single clad layer applied using spray coating meets the limitation of a "single coating". It would have been obvious to a person of ordinary skill in the art at the time of the invention to apply clad layer of Miller as a single coating since such is an art-recognized alternative of applying brazing alloy layer.

vi. Miller discloses the brazing alloy containing 5% to 14% of silicon [col. 4, line 44-48], but does not disclose including 0.01% to 0.5% of at least one element selected from the claimed group (which includes Bi, Pb, and Sb). However, **Dockus** teaches that bismuth or lead are known in prior art as useful braze modifiers, also referred to as "wetting agents" or "surface tension modifiers" [¶ 84]. Dockus discloses an aluminum brazing alloy coated (cladding layer) on the core alloy, the brazing alloy containing 5-14% Si (just like Miller) and an element selected from bismuth, lead, tin, lithium, etc. [¶ 97-98, 103]. Dockus further states that good results are obtained if one or more elements of the group Bi, Pb, Li, or Sb are added to the clad layer [¶ 112]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate one or more elements such as Bi, Pb, or Sb as shown by Dockus in the brazing alloy of Miller in order to promote brazing [¶ 84, 112].

m. **As to claim 15,** Miller discloses aging at an elevated temperature in the range of 100°C - 250°C after rapid cooling, which results in high post-brazing strength properties [col. 5, lines 26-58].

n. **As to claim 16,** Miller does not disclose the core alloy including 0.05-0.5 wt% bismuth. However, Dockus discloses that it is known in the prior art that bismuth is useful as a braze modifier, also referred to as "wetting agent" or "surface tension modifier" [¶ 84]. Dockus discloses that in one embodiment, bismuth is present in a zinc or tin-based bonding layer in an amount of up to 10 wt% to improve the wetting action during brazing [¶ 122]. In another embodiment, Dockus also states that about 0.01 to 0.05 wt% of bismuth is beneficial in a nickel-based braze-promoting layer [¶ 142]. It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate bismuth in the core alloy of Miller in order to improve wetting, thus promoting brazing.

o. **As to claim 17,** Miller discloses the core alloy comprising 0.7 wt% Mg.

p. **As to claim 18,** Miller discloses the claimed core alloy composition as explained in claim 1 above.

q. **Regarding claims 19-20,** Miller in view of Dockus discloses a brazing sheet consisting essentially of having the claimed core alloy composition [Miller-col. 3, lines 54-65; col. 4, lines 20-36] and the claimed aluminum brazing alloy coating on at least one face of the core alloy as explained in claim 1 above. No additional layers are deposited on the clad layer (brazing alloy layer) in the

brazing sheet of Miller and so the brazing alloy intrinsically occupies an entire thickness between the core alloy and a respective outer surface of the brazing sheet.

r. **As to claim 21**, Miller discloses that one or both faces of the core alloy may have a clad layer (brazing alloy layer- col. 4, lines 44-46).

s. **As to claim 22,** Miller discloses that it is known in prior art to provide Al-Si brazing layer on one side of the core, and a sacrificial anode layer of Al-Zn alloy on the other side for the purpose of reducing corrosion (col. 2, lines 4-7). Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to coat the opposed face of the core alloy with a sacrificial Al-Zn alloy in order to impart corrosion resistance to the assembly.

2. **Claim 7** is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 5863669) in view of Dockus et al. (US 20030155409) as applied to claim 1 above, and further in view of Bye et al. (US 4929511, of record).

t. **As to claim 7,** Miller or Dockus does not disclose the yttrium content of the core alloy between 0.01% and 0.5%. However, having the claimed yttrium content is well known in aluminum-based brazing alloys. **Bye et al.** is drawn to a method of making aluminum based brazing foils in fluxless brazing processes [col. 2, lines 30-33]. Bye discloses that the alloy composition includes 0-0.2 wt% of at least one element selected from bismuth, strontium, lithium, yttrium, calcium, and 0-2 wt% of at least one rare earth metals [col. 2, lines 33-42]. It would have been obvious to a person of ordinary skill in the art at the time of the

invention to include 0.1 wt% of yttrium of Bye in the core alloy of Miller because such would influence the filler metal flow, refine the microstructure of the brazed joint, thereby improving the mechanical properties of the joint [Bye- col. 2, lines 45-50].

3. **Claim 13** is rejected under 35 U.S.C. 103(a) as being unpatentable over Miller (US 5863669) in view of Dockus et al. (US 20030155409) as applied to claim 10 above, and in view of Teshima et al. (US 6234377, of record).

u. **As to claim 13,** Miller or Dockus does not disclose the brazing alloy coating containing a polymer resin. However, **Teshima et al.** (drawn to brazing composition and method of brazing Al material) discloses coating brazing alloy particles by a suitable polymer resin [col. 6, line 65- col.7, line 19]. Teshima discloses that the addition of such a resin improves properties such as the uniformity of the surface and adhesion of the coating. It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate the polymer resin of Teshima in brazing alloy coating of Miller in view Dockus in order to improve properties such as the uniformity of the coated surface and adhesion of the coating [col. 3 line 63-col.4, line 4].

Response to Amendment and Arguments

3. Applicant's arguments with respect to claims 1-22 are made in light of claims as currently amended and are moot in view of the modified ground(s) of rejection set forth above.

4. Applicant argues that Office Action asserts that Miller discloses a brazing material as a single coating of a brazing alloy. Examiner points out that the rejection does NOT rely on Miller for such teaching and thus, the argument is immaterial. With respect to the addition of Bi, Pb, or Sb, Applicant further argues that Dockus only discloses brazing material that has an additional "braze-promoting layer" along with the clad layer, and so Dockus does not teach addition of Bi, Pb, or Sb to a brazing material that did not contain a braze-promoting layer. Examiner respectfully disagrees. Dockus discloses the aluminum **clad layer** including alloying elements such as Bi, Pb, or Sb [¶ 98, 112], and such does not involve any braze-promoting layer. Dockus also generally teaches that lead and/or bismuth are known in prior art as useful braze modifiers [¶ 84]. Furthermore, Dockus discloses that where the clad layer includes wetting agents such Bi, Pb, or Sb, the incorporation of these elements into the braze-promoting layer can be completely avoided [¶ 145]. Thus, addition of Bi, Pb, or Sb is NOT limited only to braze-promoting layer. It would have been obvious to a person of ordinary skill in the art at the time of the invention to incorporate one or more elements such as Bi, Pb, or Sb in the clad layer (brazing alloy layer) of Miller in order to promote brazing and maintain consistent brazeability [Dockus- ¶ 84, 112, 145].

5. Applicant also argues that Dockus teaches the use of braze-promoting layer for fluxless, controlled atmosphere brazing, and one skilled in the art would be led to include the braze-promoting layer to be suitable for fluxless brazing technique. In response, Examiner contends that braze-promoting layer is not required to carry out fluxless brazing in an inert atmosphere. In one embodiment, Dockus discloses a brazing

sheet product which does NOT include braze-promoting layer 4 [¶ 42-43]. Miller discloses "fluxless brazing" since Miller's brazing process does not involve any flux. In any event, Dockus expressly teaches fluxless brazing in order to avoid difficulties caused by the use of flux such as flaking, contamination and cleanliness [¶ 5]. Dockus also discloses brazing in a controlled nitrogen atmosphere [¶ 226] in order to prevent oxidation. Thus, it would have been obvious to a person of ordinary skill in the art at the time of the invention to perform brazing process of Miller in a fluxless, inert atmosphere in order to avoid difficulties caused by the use of flux such as flaking, contamination & cleanliness, and prevent oxidation [Dockus- ¶ 5; ¶ 226].

Conclusion

Claims 1-22 are rejected.

The rejections above rely on the references for all the teachings expressed in the text of the references and/or one of ordinary skill in the art would have reasonably understood from the texts. Only specific portions of the texts have been pointed out to emphasize certain aspects of the prior art, however, each reference as a whole should be reviewed in responding to the rejection, since other sections of the same reference and/or various combinations of the cited references may be relied on in future rejections in view of amendments.

Applicant is reminded to specifically point out the support for any amendments made to the disclosure. See 37 C.F.R. 1.121; 37 C.F.R. Part 41.37; and MPEP 714.02.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to DEVANG PATEL whose telephone number is (571)270-3636. The examiner can normally be reached on Monday thru Thursday, 8:00 am to 5:30 pm, EST..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Jessica Ward can be reached on 571-272-1223. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Devang Patel/
Examiner, Art Unit 1793

/Kuang Y. Lin/

Primary Examiner, Art Unit 1793